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ABSOLUTE EXTRA-ATMOSPHERIC VALUES OF BRIGHTNESS
AND ILLUMINATION IN THE SPECTRAL RANGE $2.7\mu - 5.0\mu$ OF THE
CONTINUOUS SOLAR SPECTRUM

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CONTINUOUS SOLAR SPECTRUM

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Astronomichaskiy Tsirkulyar
 Izd. Buro Astronomicheskikh Soobshcheniy
 Akademii Nauk SSSR, No.344, 26 Oct. 1965

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Measurements of the continuous solar spectrum in the $2.1\mu-5.0\mu$ regions were conducted in the course of 1958 in the Tyan'-Shan' high-mountain range (at 3000 m latitude) by GAISH** using an IKS-6 spectrometer. A coelostatic installation directed the solar light to the feed system of the spectrometer. The prisms utilized consisted of common salt and sylvine crystals. A combination of thermal element with a photoelectrooptical amplifier by Kozyrev [1] served as radiation receiver, and was equipped with a photorecorder. The measurements of Sun's spectrum were accompanied by photoelectric observations on a Fesenkov's [2] aureole photometer so as to control the state of optical properties of the Earth's atmosphere [3].

In order to derive the relative extra-atmospheric values of brightness F_λ , averaged by the solar disk, ten days, relatively stable from the optical viewpoint, were utilized (see [3]). During the processing we utilized only the peaks of the spectrum most remote from the maximum absorption of radiation by water vapor, of which the content may†notably in the atmosphere as the time draws nearer the noon. The values of brightness beyond the atmosphere have been determined by the Buger method. When deriving these values the variation of dispersion was taken into account alongside with the small correction for the selective attenuation in the device which is linked with the selective reflection from an aluminum layer of ten mirrors. The absolute calibration of spectrum brightness in the interval $2.7\mu-5.0\mu$ was conducted according to the earlier published resultant curve of energy distribution in the solar spectrum [4]. The region of both energy curves' overlapping does not exceed $\pm 3\%$. The absolute values of B_λ of continuous spectrum brightness at the center of the solar disk are compiled in columns 2 and 3 of Table 1. The monochromatic illumination E_λ at average distance from Earth to Sun is given in the last column. More detailed data will be published in the Astronomicheskii Zhurnal.

* Absolyutnyye vneatmosfernyye znacheniya yarkosti i osveshchennosti v n nepreryvnom solnechnom spektre v intervale $2.7\mu-5.0\mu$.

** [GAISH is the abbreviation for the Shternberg State Astronomical Institute (at Moscow State University)].

† [insert "vary"]

TABLE 1

ABSOLUTE VALUES OF BRIGHTNESS AND ILLUMINATION
IN THE CONTINUOUS SOLAR SPECTRUM

The brightnesses B_λ and F_λ are expressed in 10^8 ergs/cm \cdot sec \cdot ster μ and the illuminations E_λ -- in 10^4 ergs/cm \cdot sec μ .

λ m μ	B_λ	F_λ	E_λ	λ m μ	B_λ	F_λ	E_λ
2.7	5.85	5.51	3.74	3.9	1.77	1.70	1.15
2.8	5.17	4.88	3.31	4.0	1.62	1.56	1.06
2.9	4.63	4.38	2.98	4.1	1.47	1.41	0.958
3.0	3.99	3.78	2.68	4.2	1.33	1.28	0.870
3.1	3.76	3.57	2.42	4.3	1.20	1.16	0.788
3.2	3.37	3.21	2.18	4.4	1.08	1.04	0.704
3.3	3.04	2.90	1.97	4.5	0.958	0.924	0.628
3.4	2.78	2.65	1.80	4.6	0.850	0.820	0.558
3.5	2.56	2.448	1.664	4.7	0.749	0.723	0.491
3.6	2.32	2.22	1.52	4.8	0.658	0.636	0.429
3.7	2.13	2.04	1.38	4.9	0.545	0.527	0.358
3.8	1.94	1.86	1.26	5.0	0.430	0.416	0.283

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